

Inventors: Tuttle, et al.

What is claimed is:

1. A method of manufacturing an enclosed device comprising the steps of:

5 providing a first film having a base portion and a cover portion, the cover portion comprising a conductor;

sealing the cover portion to the base portion to encapsulate an integrated circuit and a battery, wherein sealing electrically couples the conductor, the integrated circuit, and the battery.

10 2. The method of Claim 1 wherein the step of sealing comprises the step of folding the cover portion onto the base portion.

3. The method of Claim 1 wherein the integrated circuit comprises a transceiver.

15 4. The method of Claim 3 wherein the conductor is characterized by an antenna geometry.

5. The method of Claim 3 wherein a surface of the battery is characterized by an antenna geometry.

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6. The method of Claim 1 further comprising the step of laminating a plurality of layers to form the first film.

5 7. The method of Claim 1 further comprising the step of coating a polymer film with a barrier material to form the first film.

8. The method of Claim 7 wherein the barrier material is a material of the set consisting of silicon oxide, silicon nitride, a fluorohalocarbon, and perchlorotetrafluoroethylene.

10 9. The method of Claim 7 wherein the polymer film is polyester.

10. A method of manufacturing an enclosed device comprising the steps of:

providing a first film having an inner and an outer surface;

15 providing a second film having an inner and an outer surface, the inner surface comprising a conductor;

sealing the second film to the first film to encapsulate an integrated circuit and a battery between a

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portion of the inner surface of the first film and a portion of the inner surface of the second film, wherein sealing electrically couples the conductor, the integrated circuit, and the battery.

5        11.        The method of Claim 10 further comprising the step of coating at least one of the outer surface of the first film and the outer surface of the second film with a material for preventing contamination of the enclosed device.

10       12.        The method of Claim 10 further comprising the step of coating the inner and outer surface of the first film and the inner and outer surface of the second film with a material for preventing contamination of the enclosed device.

15       13.        The method of Claim 10 wherein the material is a material of the set consisting of silicon oxide, silicon nitride, a fluorohalocarbon, and perchlorotetrafluoroethylene.

14.        The method of Claim 10 wherein the step of coating comprises a process of the set consisting of sputtering, deposition, evaporation, chemical vapor deposition, and plasma enhanced chemical vapor deposition.

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15. The method of Claim 11 further comprising the step of applying adhesive superjacent to the inner surface of the first film.

5 16. The method of Claim 15 wherein the conductor is printed superjacent to the adhesive.

17. The method of Claim 16 wherein the shape of the conductor comprises an aperture for exposing adhesive through the aperture.

10 18. The method of Claim 10 wherein the integrated circuit comprises a transceiver for receiving a signal.

19. The method of Claim 18 wherein the conductor is characterized by an antenna geometry, the conductor conducts battery power to the integrated circuit, and the conductor receives the signal.

15 20. The method of Claim 10 wherein the step of sealing comprises:

pressing together the first film and the second film; and

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pressing together a portion of the first film and a portion of the second film, the portion of the first film and the portion of the second film circumscribing at least one of the integrated circuit and the battery.

5        21.        A method of manufacturing an enclosed transceiver comprising the steps of:

              preparing a first film from a first polymer film, the first polymer film having a first inner side and a first outer side, the step of preparing comprising:

10               applying a first layer of barrier material to the first inner side for reducing the porosity of the first polymer film;

              applying a second layer of nonconductive adhesive, the second layer covering a portion of the first layer; and

15               selectively applying a third layer of conductive adhesive to form a first conductor on a portion of the second layer;

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preparing a second film from a second polymer film,  
the second polymer film having a second inner side and a  
second outer side, the step of preparing comprising:

5           applying a third layer of barrier material to the  
second inner side for reducing the porosity of the  
second polymer film;

applying a fourth layer of nonconductive adhesive,  
the fourth layer covering a portion of the third  
layer; and

10           selectively applying a fifth layer of conductive  
adhesive to form a second conductor on a portion of  
the fourth layer;

adhering an integrated circuit transceiver and a  
battery to the first conductor; and

15           sealing the first film to the second film to  
encapsulate the transceiver and the battery between a portion  
of the first inner side and the second inner side, wherein  
sealing electrically couples the second conductor to the

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transceiver thereby powering the transceiver to receive a signal.

5 22. The method of Claim 21 wherein the step of adhering the further comprises the step of applying a second material superjacent to the integrated circuit for stiffening, and exposing the second material to ultraviolet radiation for curing the second material.

23. The method of Claim 21 wherein a portion of the battery is coupled to the integrated circuit for an antenna.

10 24. A method for testing a transceiver, the transceiver formed in a sheet, the method comprising the steps of:

15 pressing the sheet between a first shield and a second shield, the first shield and the second shield forming a cavity enclosing a transceiver, the first shield comprising a test antenna; and

receiving a signal through the test antenna for determining the quality of the transceiver.